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(12) Patent:

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(54) MEAT PROCESSING

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ABSTRACT:

CLAIMS: [Show all claims](#)

*** Note: Data on abstracts and claims is shown in the official language in which it was submitted.

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This invention relates to meat preparing processes and more particularly to the preparation of meat products for consumer use which have been packaged, cured and cooked.

One of the problems encountered by meat processors in reconstituting or improving the color of cooked meat products, is the relatively long duration of the curing period during which the curing agents react with the meat pigments. It is therefore a primary object of the present invention to provide a meat preparing process wherein curing of the meat is substantially
10 accelerated to thereby reduce processing time.

In accordance with the foregoing object, an additional object of the present invention is to provide a process wherein means obtained from freshly slaughtered animals is comminuted while the meat is in a fresh state resulting in a meat emulsion capable of being rapidly cured during packaging and cooking without any long waiting period and costly chilling and handling operations.

A further object of the present invention is to provide a hot boning method for preparing packaged meat that is rapidly cured and heat processed resulting in a product that is stable
20 and has improved flavor and color.

The important discovery of the present invention, is that a cured meat color may be rapidly developed while meat is subjected to heat processing temperatures if the meat is in a fresh state shortly after slaughter of the animal from which the meat is obtained. The rapid curing period which is less than 15 minutes in the process of the present invention compares favorably with existing curing methods as hereinbefore developed using standard curing ingredients.

The usual procedure followed in the meat packing industry

involves chilling the animal carcass or boned products thereof after it is slaughtered and dressed. The meat is then withdrawn from frozen or refrigerated storage for processing requiring the introduction of water in the form of ice or brine in order to maintain the meat at a temperature below 65° F. during comminution in order to produce a stable emulsion. If curing agents are then introduced, the meat must undergo a curing period of substantial length or else subjected to moderate heat processing temperatures for several hours in order to permit the cure to develop.

- 10 Contrary to the foregoing procedure, a hot boning method is followed in connection with the present invention as described for example in U. S. Patent No. 3,124,462, to Vogel et al, issued March 10, 1964.

- One possible explanation which accounts for the considerable decrease in curing time which results from the use of freshly slaughtered meat in accordance with the present invention, is the ability of such meat to consume entrapped oxygen within a limited period of time. It is known that entrapped oxygen in a meat emulsion slows down the curing reaction and decreases the
- 20 stability of the cured product. Thus, the comminution of the meat while it is in a fresh state may account for its tolerance of entrapped air and the development of cured color within minutes while the meat is subsequently subjected to heat processing temperatures.

Referring now to the drawing, a work flow diagram is shown illustrating a typical handling procedure in accordance with the present invention. Meat in the form of pork and beef is obtained from freshly slaughtered carcasses delivered from the slaughter stations 10 and 12 to the boning station 14. The

freshly slaughtered carcasses undergo the conventional treatment including scalding, dehairing, singeing and evisceration before the meat is removed from the carcasses and divided into cuts and trimmings as well as into lean and fat components. The carcasses are boned immediately after slaughter so that while the meat is still in a fresh state, it may be comminuted in order to form a meat emulsion. The lean components are delivered from the boning station 14 to the station 16 at which it is finely comminuted for approximately two minutes by means of a chopper into which a
10 brine solution 18 is introduced. The balance of the meat components together with the comminuted lean components from station 16, are finally comminuted by a chopper at station 20. The meat is chopped at station 20 for three or four minutes. The curing agents and flavoring 22 are added at any time during comminution whether it be at station 16 or station 20. Thus, the curing period is initiated while the meat is being comminuted at station 20. The comminuted meat is then stuffed and packaged within packaging material such as "Saran" (a trademark of Dow Chemical Co.) or cellulose weiner casings at packaging station 24. After packaging,
20 the meat is cooked at station 26 wherein it is heat processed in a 250° to 300° F. chamber for example, until the meat reaches an internal temperature of approximately 160°F. While the meat is cooking, a full cure develops within minutes. The product after being heat processed is then removed from the heating chamber and rapidly chilled at station 28 after which it is finally packaged for consumer use.

In carrying out the method of the present invention, elapsed time and internal temperatures of the meat as it progresses from the slaughter station to the finished product, are critical
30 factors although the actual time and temperature values may vary

considerably dependent upon plant and equipment conditions and ambient air conditions. It will be appreciated for example that performance of the method steps within wider time and temperature limits may be possible where certain operations are performed under vacuum. Also, in performing the method of the present invention it has been found that a suitable curing agent consists of a compound of nitrite and a salt of ascorbic acid such as sodium erythorbate. Where the meat emulsion has a finishing temperature above approximately 65°F. to 70°F. or where the meat is to be heat processed in air impermeable casings, the salt must be added in the form of brine. Also, the pH value of the meat must be above approximately 6.0 before comminution as a further condition for a stable emulsion.

The following charts are specific examples of ingredients and procedural steps utilized in accordance with the present invention producing cured and cooked meat products consisting of a mixture of beef and pork.

EXAMPLE I

A - Ingredients	<u>Quantity</u>
1 - Beef.....	20 lbs.
2 - Pork.....	80 lbs.
3 - Brine a) Water.....	10 lbs.
b) Salt.....	1.75 lbs.
4 - Curing Agent a) Sodium Nitrite.....	7.0 grams
b) Sodium Erythorbate....	20.0 grams
5 - Flavouring.....	7.75 ozs.
6 - Air impermeable packaging material (Saran)	

857827

B - Steps	Elapsed Time (Min.)	Temp. (°F.)
1 - Slaughter	45	
2 - Boning	60-75	100
3 - Comminution	90	92
4 - Packaging	100	90
5 - Heat processing	110	90-160
6 - Chilling	130	

EXAMPLE II

A - Ingredients	Quantity
10 1 - Beef	20.0 lbs.
2 - Pork	80.0 lbs.
3 - Brine a) Water	15.0 lbs.
b) Salt	1.75 lbs.
4 - Curing Agent a) Sodium Nitrite	7.0 grams
b) Sodium Erythorbate	20.0 grams
5 - Flavoring	7.75 ozs.
6 - Cellulose packaging material	

B - Steps	Elapsed Time (Min.)	Temp. (°F.)
20 1 - Slaughter	45	
2 - Boning	60-75	100
3 - Chilling	90	30
4 - Comminution	130	40-50
5 - Packaging	140	55
6 - Heat processing	150	55-160
7 - Chilling	170	

In connection with Example I, it will be observed that the boned meat products are comminuted while they are above 70° F. contrary to what was thought to be an upper limit above which a stable emulsion is not possible. The stability of the emulsion obtained from comminution at such temperatures, is possible only because of the freshness of the meat or the relatively short period of time following slaughter when comminution is begun. It is

essential however that the salt be added by means of a brine solution before or during comminution if the resulting product is to be heat processed in air impermeable material. The only other critical factor in the comminution operation for purposes of the present invention is that the pH value of the meat be above approximately 6.0 before comminution to obtain the stable emulsion as aforementioned. A stable emulsion may, of course, also be obtained by chilling the meat below 65°F. before comminution, to 30°F. for example, as indicated under Example II-b, step 3.

10 From the foregoing description, it will be appreciated that the method of the present invention is unique in that it eliminates the waiting period for completion of curing. Accordingly, meat may be processed in accordance with the present invention in a continuous flow system from live animal to finished product within a relatively short period of time eliminating various handling, storing and chilling operations. Also, the basic principles of the method could be applied to several variations of the procedures specifically set forth as Examples I and II hereinbefore. For example, after the meat emulsion is
20 sealed within its air impermeable casing, it could be stored at a low storage temperature for a prolonged period before cooking because of the ability of the product to retain its freshness and flavor as set forth in the aforementioned U.S. Patent No. 3,124,462. Where the comminuted meat is packaged in a porous casing, it could also be smoked in addition to being cooked. In all cases, however, since emulsification is performed on meat which is freshly slaughtered, no coarse grinding of thawed meat need precede the fine comminution or chopping operation. In addition to the application of the present method to beef and pork, it could also
30 be applied to other meats such as poultry as well as to ham in which case a warm brine solution containing curing agents is

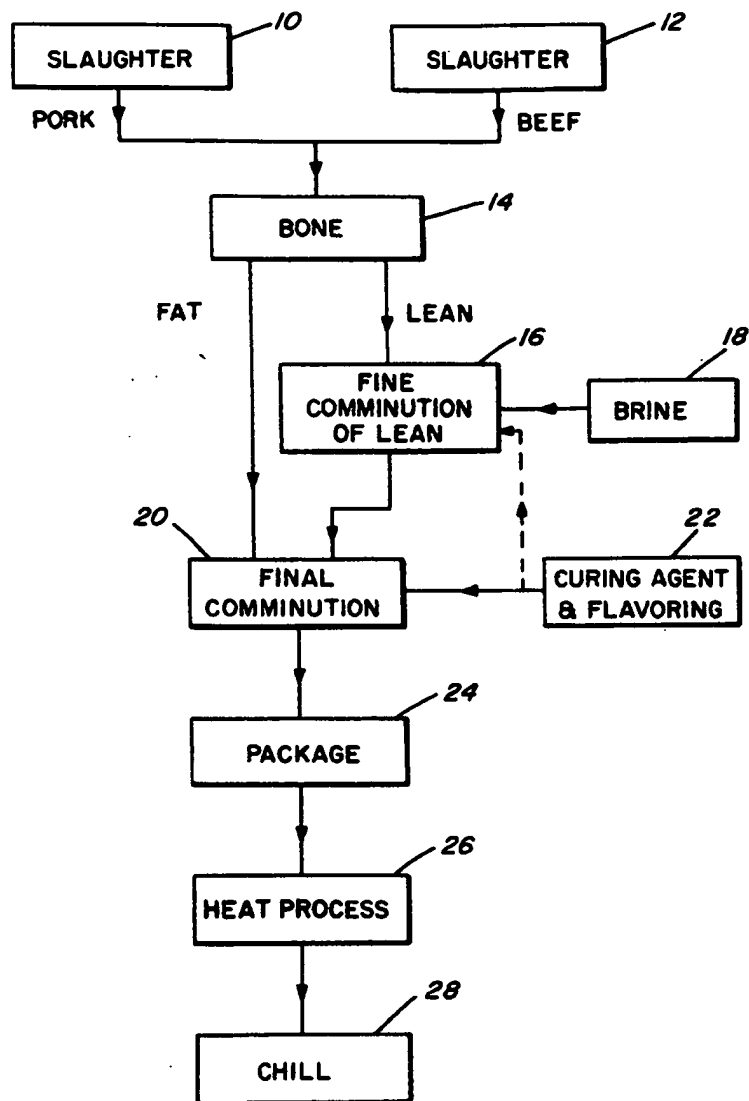
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pumped or injected into the arteries immediately after hot boning of the carcass before the ham is sealed in an air impermeable casing or comminuted before packaging and then cooked in its packaged state.

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THE EMBODIMENT OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A method of preparing a cured meat product from hot boned meat removed from a freshly slaughtered Carcass, including the steps of: adding curing agents to said meat during a limited exposure period following slaughter while the meat is still in a fresh state; packaging the meat to terminate said exposure period during which curing is initiated; and heat processing the packaged meat during which curing continues at an accelerated rate.
2. The method of claim 1 wherein the meat is comminuted during the exposure period at a temperature above 65°F. to produce a stable emulsion having a pH value above approximately 6.0.
3. The method of claim 2 wherein the meat is packaged in an air impermeable packaging material.
4. The method of claim 1 wherein the meat is chilled to a temperature below 65°F. and then comminuted to produce a stable emulsion during said exposure period.
5. The method of claim 4 wherein the meat is packaged in an air impermeable packaging material.
6. The method of claim 1 wherein the meat is packaged in an air impermeable packaging material.



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